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Accelerated Degradation Studies of MEH-PPV* --H.B. RADOUSKY, A. D. MADDEN, K. PAKBAZ, T. W. HAGLER, H. W. H. LEE, H. E. LORENZANA, G. A. FOX, P. R. ELLIKER Lawrence Livermore National Laboratory, Livermore, CA 94551, USA; J. C. SCOTT, J. KAUFMAN, P.J. BROCK AND R.A. DIPIETRO IBM Almaden Research Center -- MEH-PPV is a material of current interest due to its potential as the active element in electroluminescent devices. While simple three layer devices containing MEH-PPV have been demonstrated, their usefulness is limited due to a variety of degradation mechanisms. We have studied one class of degradation in MEH-PPV using photoluminescence (PL). MEH- PPV, which normally has a reddish color, is well known to show photobleaching problems. Samples left in air and light for several days will lose all color due to this effect. The photobleaching can be greatly accelerated by exposure to laser light while in air. For example, shining 457 nm light of relatively low intensity (0.2 W/cm^2) on the MEH-PPV causes the photoluminescence to decrease by a factor of two within few seconds of exposure, and to show a nearly complete bleaching of the material within 30 minutes. This dramatic decrease in PL intensity is accompanied by a strong shift in the PL peak to higher energies. We present data on the PL of MEH-PPV, synthesized by two different routes, as a function of laser energy, laser power, time and environmental conditions such as atmosphere and temperature. The photo-physics underlying the chemical changes occurring under these various conditions will be discussed.

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